

WHAT IS CLAIMED IS:

- 1 1. A gas-liquid inertial separator, comprising
2 a) an elbow having an internal wall;
3 b) a fishbone separation enhancer, comprising
4 b)i) a plurality of longitudinally extending vanes
5 positioned across the direction of gas flow and spaced
6 apart along the direction of gas flow; and
7 b)ii) optionally, a central spine to which said vanes are
8 attached,
9 wherein the vanes are oriented downwards in their longitudinal direction with
10 respect to gravity such that liquid collected from liquid-containing gas flowing
11 through said elbow runs downwards to at least one collection site.
- 1 2. The separator of claim 1, wherein said vanes are of hollow
2 construction and have at least one opening along a length thereof.
- 1 3. The separator of claim 2, wherein said opening is along the
2 entire length of the vane, said vane positioned such that the opening faces the
3 direction of flow of gas flowing through said elbow.
- 1 4. The separator of claim 1, wherein said vanes are mounted on
2 struts which extend from said spine, or from said elbow.
- 1 5. The separator of claim 1, wherein said vanes have a cross-
2 section having a height greater than a thickness, said vanes mounted such that an
3 axis through the height of the cross-section is angled from the direction of gas flow
4 by from 20° to about 90°.
- 1 6. The separator of claim 5, wherein said vanes are hollow and
2 have an opening along a length thereof, said opening facing the direction of gas
3 flow, the opening located such that the hollow vane has a fluid collecting lip located
4 at the bottom thereof.

1 7. The separator of claim 1, wherein a spine is present, and said
2 vanes slope downward from said spine and terminate proximate an internal wall of
3 said elbow.

1 8. The separator of claim 1, wherein a spine is present, said
2 vanes slope downward towards said spine, said spine is hollow to provide a
3 downward fluid flow path, and holes in said spine communicate with said vanes to
4 provide a path for fluid collected by said vanes to enter said spine.

1 9. The separator of claim 1, wherein said vanes are hollow, have
2 an opening along the length thereof, and are slidably attachable over said strut.

1 10. The separator of claim 1 wherein said spine is a metal spine
2 having a width of about one half or less of the internal diameter of said elbow.

1 11. The separator of claim 11, wherein said spine is oriented
2 vertically in said elbow when the inlet to the elbow is in a horizontal plane.

1 12. The separator of claim 1, wherein said elbow has a circular
2 cross section.

1 13. The elbow of claim 1, wherein said elbow has a polygonal
2 cross section.

1 14. The elbow of claim 1, wherein no spine is present, and
2 wherein said vanes are each fixed to at least one interior wall of said elbow.

1 15. The separator of claim 1, said separator having a spine, said
2 spine floatingly positioned within said elbow.

1 16. The separator of claim 1, wherein a bottom end of said spine
2 is located within said elbow by a first retainer fixed to a wall of said elbow, and

3 wherein a top portion of said spine is located within said elbow by a link moveably
4 connected to an upper retainer fixed to a wall of said elbow and moveably connected
5 to said top portion of said spine.

1 17. The separator of claim 16, wherein said link is a unitary link
2 rotatably connected to said upper retainer and rotatably connected to said top portion
3 of said spine.

1 18. A process for the separation of droplets of liquid from a
2 flowing gas stream, comprising directing said gas stream into a separator of claim
3 1, collecting liquid by contact of said droplets with said fishbone separation
4 enhancer and walls of said elbow, and providing an exit gas stream which is
5 depleted of liquid droplets.

1 19. The process of claim 16, wherein an inlet end of said elbow
2 is in fluid communication with a process vessel which emanates a stream of liquid
3 droplet-containing gas into said elbow, and collected liquid is directed back into said
4 vessel from said separator.

1 20. The process of claim 16, wherein said vessel is a
2 polymerization reactor, and said liquid droplets comprise at least one of liquid
3 monomers or oligomers.